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EXAMINER	
BALL, JOHN C	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/511,012	MOROOKA ET AL.	
	Examiner	Art Unit	
	J. CHRISTOPHER BALL	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2010 and 11 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application.
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. This Office Action is based on the Request for Continued Examination filed with the Office on February 11, 2010, and the Amendment file with the Office on January 20, 2010, regarding the MOROOKA et al. application.

2. Claims 1-14 are currently pending and have been fully considered.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 20, 2010, has been entered.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over YONEHARA et al., an English translation of a Japanese Patent Application Publication (2000-306605, A), submitted to the Office on an Information Disclosure Statement, in view of BENDER et al. (US 3,751,375).

Regarding claim 1, YONEHARA discloses a solid electrolyte for use in electrical system, wherein is taught the method of forming an electrolyte comprising:

forming a matrix polymer by polymerizing a first compound having at least two isocyanate groups (compounds containing diisocyanate groups, paragraphs [0058] and [0070]) and a second compound having at least two nucleophilic groups containing active hydrogen (material containing alkylene glycol derivatives; claim 2),

said polymerization being preformed after a precursor for the matrix polymer is brought into contact with a surface on which the electrolyte is to be formed (paragraph [0109]); wherein the electrolyte layer (2, Drawing 1) is formed between two electrodes (1 and 3, Drawing 1).

YONEHARA does not explicitly teach a compound having at least three isocyanate groups.

However, BENDER discloses a polymer, wherein is taught the substitution of diisocyanate compounds with triisocyanate compounds (Col. 9, lines 1-8).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the method as taught by YONEHARA by the substitution of diisocyanate compounds with triisocyanate compounds, as taught by BENDER because it allows control of the amount and rate of crosslinking of the polymer matrix as well as forming a more rigid polymer (BENDER, Col. 9, lines 1-8).

Regarding claims 2 and 4, YONEHARA teaches the electrolyte composition comprises a solvent, including an ionic liquid, to form a gel electrolyte (paragraph [0100]).

Regarding claim 3, YONEHARA teaches the electrolyte composition comprises no solvent to form a solid electrolyte (paragraph [0102]).

7. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over YONEHARA et al., an English translation of a Japanese Patent Application Publication (2000-306605, A), submitted to the Office on an Informational Disclosure Statement, in view of BENDER et al. (US 3,751,375), as applied to claims 1-4 above, and in further view of SHACKLE (WO 97/08719).

Regarding claims 5-7, YONEHARA, as modified by BENDER, teaches the limitations of claim 1, as outlined above.

YONEHARA does not explicitly teach the electrolyte composition comprises a redox couple.

However, SHACKLE discloses a photoelectrochemical cell, wherein is taught an electrolyte that is formed comprising a redox couple of LiI and I_2 (lines 7-8, page 16).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the method of forming an electrolyte as taught by YONEHARA to include the step of adding the LiI/I_2 redox couple into the electrolyte as taught by SHACKLE because it will allow the solid electrolyte to be suitable for use in photoelectrochemical cells (SHACKLE, lines 13-15, page 1).

8. Claims 8 -14 are rejected under 35 U.S.C. 103(a) as being unpatentable over NAKAMURA (US 6,291,763 B1) in view of TAKEYAMA et al. (US 4,902,440) and BENDER (US 3,751,375).

Regarding claim 8, NAKAMURA discloses a photocell comprising:

a semiconductor layer composed of semiconductor particles carrying a dye (3, Figure 1; Col. 5, lines 14-15; Col. 29, lines 43-45) and an electrolyte layer (5, Figure 1), the layers being provided between a counter electrode (6, Figure 1) and an electrode (2, Figure 1) formed on a surface of a substrate (1, Figure 1);

where the electrolyte layer has a redox couple (Col. 25, lines 18-28), an electrolyte composition (Col. 25, lines 44-46), and a matrix polymer (Col. 26, lines 16-19).

While NAKAMURA teaches several particular matrix polymers, NAKAMURA does not explicitly teach the matrix polymer is formed by polymerization of a first compound having at least two isocyanate groups and a second compound having at least two nucleophilic groups containing active hydrogen atoms.

However, TAKEYAMA discloses UV-curable polymers wherein is taught a polymer is formed by polymerization of a first compound having at least two isocyanate groups, in the form of tolylene diisocyanate, and a second compound having at least two nucleophilic groups containing active hydrogen atoms, in the form of polytetramethylene glycol (Col. 9, line 65 – Col. 10, line 18).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the photocell as taught by NAKAMURA by utilizing the polymer as taught by TAKEYAMA because the polymer taught by TAKEYAMA would be a simple substitution of one known element for another known element with a predictable expectation of success (*KSR International Co. v. Teleflex Inc., 550 U.S.__, 82 USPQ2d 1385 (2007)*).

NAKAMURA and TAKEYAMA do not explicitly teach a compound having at least three isocyanate groups.

However, BENDER discloses a polymer, wherein is taught the substitution of diisocyanate compounds with triisocyanate compounds (Col. 9, lines 1-8).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the device as taught by NAKAMURA and TAKEYAMA by the substitution of diisocyanate compounds with triisocyanate compounds, as taught by BENDER because it allows control of the amount and rate of crosslinking of the polymer matrix as well as forming a more rigid polymer (BENDER, Col. 9, lines 1-8).

Regarding claim 9, NAKAMURA teaches the substrate is glass, which is transparent (Col. 34, lines 29-30).

Regarding claim 10, NAKAMURA discloses a method for manufacturing a photocell, comprising:

injecting a mixed solution between a counter electrode (6, Figure 1) and an electrode (2, Figure 1) formed on a substrate (1, Figure 1), and polymerizing the mixed solution after it is brought into contact with electrode formed on the surface of the substrate (Col. 28, line 63 - Col. 29, line 3).

While NAKAMURA teaches several particular matrix polymers, NAKAMURA does not explicitly teach the matrix polymer is formed by polymerization of a first compound having at least two isocyanate groups and a second compound having at least two nucleophilic groups containing active hydrogen atoms.

However, TAKEYAMA discloses UV-curable polymers wherein is taught a polymer is formed by polymerization of a first compound having at least two isocyanate groups, in the form of tolylene diisocyanate, and a second compound having at least two nucleophilic groups containing active hydrogen atoms, in the form of polytetramethylene glycol (Col. 9, line 65 – Col. 10, line 18).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the photocell as taught by NAKAMURA by utilizing the polymer as taught by TAKEYAMA because the polymer taught by TAKEYAMA would be a simple substitution of one known element for another known element with a predictable expectation of success (*KSR International Co. v. Teleflex Inc., 550 U.S.__, 82 USPQ2d 1385 (2007)*).

NAKAMURA and TAKEYAMA do not explicitly teach a compound having at least three isocyanate groups.

However, BENDER discloses a polymer, wherein is taught the substitution of diisocyanate compounds with triisocyanate compounds (Col. 9, lines 1-8).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the method as taught by NAKAMURA and TAKEYAMA by the substitution of diisocyanate compounds with triisocyanate compounds, as taught by BENDER because it allows control of the amount and rate of crosslinking of the polymer matrix as well as forming a more rigid polymer (BENDER, Col. 9, lines 1-8).

Regarding claim 11, NAKAMURA teaches a semiconductor layer composed of semiconductor particles carrying a dye (3, Figure 1; Col. 5, lines 14-15; Col. 29, lines 43-45) being provided between a counter electrode (6, Figure 1) and an electrode (2, Figure 1) formed on a surface of a substrate (1, Figure 1).

Regarding claim 12, NAKAMURA as modified by TAKEYAMA teaches a polymer is formed by polymerization of a first compound having at least two isocyanate groups, in the form of tolylene diisocyanate, and a second compound having at least two nucleophilic groups containing active hydrogen atoms, in the form of polytetramethylene glycol (TAKEYAMA, Col. 9, line 65 – Col. 10, line 18).

These compounds would inherently result in a Michael addition reaction upon polymerization.

Regarding claim 13, NAKAMURA teaches the electrolyte composition has a redox couple (Col. 25, lines 18-28).

Regarding claim 14, NAKAMURA discloses a method for manufacturing a photocell, comprising:

forming a semiconductor layer composed of semiconductor particles carrying a dye (3, Figure 1; Col. 5, lines 14-15; Col. 29, lines 43-45) being provided between a counter electrode (6, Figure 1) and an electrode (2, Figure 1) formed on a surface of a substrate (1, Figure 1); and polymerizing compounds after they are brought into contact with electrode formed on the surface of the substrate (Col. 28, line 63 - Col. 29, line 3).

While NAKAMURA teaches several particular matrix polymers, NAKAMURA does not explicitly teach the matrix polymer is formed by polymerization of a first compound having at least two isocyanate groups and a second compound having at least two nucleophilic groups containing active hydrogen atoms.

However, TAKEYAMA discloses UV-curable polymers wherein is taught a polymer is formed by polymerization of a first compound having at least two isocyanate groups, in the form of tolylene diisocyanate, and a second compound

having at least two nucleophilic groups containing active hydrogen atoms, in the form of polytetramethylene glycol (Col. 9, line 65 – Col. 10, line 18).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the photocell as taught by NAKAMURA by utilizing the polymer as taught by TAKEYAMA because the polymer taught by TAKEYAMA would be a simple substitution of one known element for another known element with a predictable expectation of success (*KSR International Co. v. Teleflex Inc., 550 U.S.__, 82 USPQ2d 1385 (2007)*).

NAKAMURA and TAKEYAMA do not explicitly teach a compound having at least three isocyanate groups.

However, BENDER discloses a polymer, wherein is taught the substitution of diisocyanate compounds with triisocyanate compounds (Col. 9, lines 1-8).

At the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the method as taught by NAKAMURA and TAKEYAMA by the substitution of diisocyanate compounds with triisocyanate compounds, as taught by BENDER because it allows control of the amount and rate of crosslinking of the polymer matrix as well as forming a more rigid polymer (BENDER, Col. 9, lines 1-8).

Response to Arguments

9. Applicant's arguments, see Remarks, p. 5-7, filed January 20, 2010, with respect to the rejection(s) of claim(s) 1-14 under either 35 USC 102(b) or 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the newly found prior art, BENDER et al.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. CHRISTOPHER BALL whose telephone number is (571)270-5119. The examiner can normally be reached on Monday through Thursday, 9 am to 5 pm Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

JCB
02/24/2010